# Algebraic Expressions and Identities

**1.) Simplify: $(2x^2 - 3xy^2)^2$**

ANSWER:

Here we use identity.

$(a - b)^2 = a^2 - 2ab + b^2$

a = $2$, b = $3xy^2$

$(2x^2 - 3xy^2)^2 = (2x^2)^2$ x (-2 x $2x^2$ x $3xy^2$) + $(3xy^2)^2$

$\mathbf{(2x^2 - 3xy^2)^2 = 4x^4 - 12x^3y^2 + 9x^2y^4}$

**2.) Simplify: $(25x^2 - 16y^2) \div (5x + 4y)$**

ANSWER:

$(25x^2 - 16y^2)$ = we write this as, $a^2 - b^2$

a = $5x$ b = $4y$

We know,

$(a + b)(a - b) = a^2 - b^2$

$(5x + 4y)\ (5x - 4y) = (25x^2 - 16y^2)$

$(25x^2 - 16y^2) \div (5x + 4y) = (5x + 4y)\ (5x - 4y) \div (5x + 4y)$

$\mathbf{(25x^2 - 16y^2) \div (5x + 4y) = (5x - 4y)}$

**3. ) Simplify: $(3a + 2b)\ (3a - 2b) - 5b^2$**

ANSWER:

We know,

$(a + b)(a - b) = a^2 - b^2$

We put, a = 3a, b = 2b

$(3a + 2b)\ (3a - 2b) = 3a^2 - 2b^2$

$(3a + 2b)\ (3a - 2b) - 5b^2 = (3a)^2 - (2b)^2 - 5b^2$

$\mathbf{(3a + 2b)\ (3a - 2b) - 5b^2 = 9a^2 - 9b^2}$

**4.) Simplify: $(4x - 3y)^2 + 24xy$**

ANSWER:

Here $(4x - 3y)^2 + 24xy$

We use $(a - b)^2 = a^2 - 2ab + b^2$

a = 4, b = $3y$

= $(4x)^2$ x (-2 x 4x x $3y$) + $(3y)^2$

$(4x - 3y)^2 = 16x^2 - 24xy + 9y^2$

$16x^2 - 24xy + 9y^2 + 24xy$

$(4x - 3y)^2 + 24xy = 16x^2 + 9y^2$

**5.) Simplify: $9x^2+24xy+16y^2 / 3x+4y$**

ANSWER:

We know,

$(a + b)^2 = a^2 + 2ab + b^2$

$9x^2+24xy+16y^2 = (3x + 4y)^2$

$9x^2+24xy+16y^2 / 3x+4y = (3x + 4y)^2 / 3x+4y$

$9x^2+24xy+16y^2 / 3x+4y = 3x+4y$

**6.) Simplify: $(x^2 + 5x + 6) \div (x + 2)$**

ANSWER:

Here we use,

$(x + a)(x + b) = x^2 + (a + b)x + ab$

a = 2 and b = 3

$(x^2 + 5x + 6)$ we put this as $(x + 2)$ $(x + 3)$

$(x + 2)$ $(x + 3) \div (x + 2)$

$(x^2 + 5x + 6) \div (x + 2) = (x + 3)$

**7.) Simplify: $(6.25p^2 - 2.25q^2) \div (2.5p + 1.5q)$**

ANSWER:

We know,

$(\boldsymbol{a} + \boldsymbol{b})(\boldsymbol{a} - \boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

We put, a = 6.25p, b = 2.25q

$(\mathbf{6.25}\boldsymbol{p}^2 - \mathbf{2.25}\boldsymbol{q}^2)$ = (6.25p + 2.25q) (6.25p - 2.25q)

$(\mathbf{6.25}\boldsymbol{p}^2 - \mathbf{2.25}\boldsymbol{q}^2) \div (\mathbf{2.5}\boldsymbol{p} + \mathbf{1.5}\boldsymbol{q}) =$

(6.25p + 2.25q) (6.25p - 2.25q) $\div (\mathbf{2.5}\boldsymbol{p} + \mathbf{1.5}\boldsymbol{q})$

$= \mathbf{2.5}\boldsymbol{p} - \mathbf{1.5}$q

**8.) Simplify: $(\mathbf{7}\boldsymbol{x} + \mathbf{4}\boldsymbol{y})^2 - \mathbf{49}\boldsymbol{x}^2 - \mathbf{16}\boldsymbol{y}^2$**

ANSWER:

$(\mathbf{7}\boldsymbol{x} + \mathbf{4}\boldsymbol{y})^2$ Here we use $(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \mathbf{2}\boldsymbol{a}\boldsymbol{b} + \boldsymbol{b}^2$

a = 7x b = 4y

$7x^2 + \mathbf{2}$x 7x X 4y + $4y^2$

$(\mathbf{7}\boldsymbol{x} + \mathbf{4}\boldsymbol{y})^2 = 49x^2 + 56xy + 16y^2$

$(\mathbf{7}\boldsymbol{x} + \mathbf{4}\boldsymbol{y})^2 - \mathbf{49}\boldsymbol{x}^2 - \mathbf{16}\boldsymbol{y}^2 = 49x^2 + 56xy + 16y^2 - \mathbf{49}\boldsymbol{x}^2 - \mathbf{16}\boldsymbol{y}^2$

$\boldsymbol{(7x + 4y)^2 - 49x^2 - 16y^2 = 56xy}$

**9). Simplify: $(\boldsymbol{x}^2 + \mathbf{10}\boldsymbol{x} + \mathbf{25}) \div (\boldsymbol{x} + \mathbf{5})$**

ANSWER:

$(\boldsymbol{x}^2 + \mathbf{10}\boldsymbol{x} + \mathbf{25})$ Here we use $(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \mathbf{2}\boldsymbol{a}\boldsymbol{b} + \boldsymbol{b}^2$

a = x b = 5

$(\boldsymbol{x}^2 + \mathbf{10}\boldsymbol{x} + \mathbf{25}) = (\boldsymbol{x} + \mathbf{5})^2$

$(\boldsymbol{x}^2 + \mathbf{10}\boldsymbol{x} + \mathbf{25}) \div (\boldsymbol{x} + \mathbf{5}) = \boldsymbol{x} + \mathbf{5})^2 \div (\boldsymbol{x} + \mathbf{5})$

$\boldsymbol{(x^2 + 10x + 25) \div (x + 5) = x + 5}$

**10.) Simplify: $(\boldsymbol{a} + \boldsymbol{b})\ (\boldsymbol{a}^2 + \boldsymbol{b}^2 - \boldsymbol{a}\boldsymbol{b})$**

ANSWER:

We know, standard identity,

$\boldsymbol{a}^3 + \boldsymbol{b}^3 = (\boldsymbol{a} + \boldsymbol{b})\ (\boldsymbol{a}^2 + \boldsymbol{b}^2 - \boldsymbol{a}\boldsymbol{b})$

$(a + b)(a^2 + b^2 - ab) = a^3 + b^3$

**11.) Simplify: $(m^2 + mn + n^2)(m - n)$**

ANSWER:

We know, standard identity

$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$

Here, a= m  b = n

**$(m^2 + mn + n^2)(m - n) = m^3 - n^3$**

**12.) If $a = 3, b = 4$, then find the value of $(a + b)^2 + ab$**

ANSWER:

Given, $a = 3, b = 4$ we put this value in $(a + b)^2 + ab$

$(a + b)^2 + ab = (3 + 4)^2 + (3 \times 4)$

$(a + b)^2 + ab = (9 + 24 + 16) + 12$

**$(a + b)^2 + ab = 49 + 12$**

**$(a + b)^2 + ab = 61$**

**13.) If $m = -5, n = 7, a = 3, b = 3$, then find the value of $(a - b)^3 + (m + n)^2$**

ANSWER:

Here, we use

$(a - b)^3 = a^3 - b^3 - 3ab(a - b)$

Here a = 3 and b = 3

$(a - b)^3 = 3^3 - 3^3 - 3 \times 3 \times 3 (3 - 3)$

$(a - b)^3 = 0$

$(m + n)^2 = m^2 + 2mn + n^2$

Here $m = -5, n = 7$

$(m + n)^2 = -5^2 + 2 \times -5 \times 7 + 7^2$

$(m + n)^2 = 25 - 70 + 49$

$(m + n)^2 = 4$

$(a - b)^3 + (m + n)^2 = 0 + 4$

$\mathbf{(a - b)^3 + (m + n)^2 = 4}$

**14.) If $p = 7, q = -5$ then find the value of $(q + p)^2 - qp$**

ANSWER:

$(q + p)^2 - qp$

Here we use,

$(q + p)^2 = q^2 + 2qp + p^2$

Here, $p = 7, q = -5$

$(q + p)^2 = -5^2 + 2 \times -5 \times 7 + 7^2$

$(q + p)^2 = 25 - 70 + 49$

$(q + p)^2 = 4$

$(q + p)^2 - qp = 4 - (7 \times -5)$

$\mathbf{(q + p)^2 - qp = 39}$

**15.) If $x = 10, y = 17$ then find the value of $(x - y)^2 + (x + y)$**

ANSWER:

$(x - y)^2 + (x + y)$

Here we use,

$(x - y)^2 = {}^2 - 2x\ y + y^2$

$(x - y)^2 + (x + y) = x^2 - 2x\ y + y^2 + (x + y)$

$x = 10, y = 17$

$10^2 - 2 \times 10 \times 17 + 17^2 + (10 + 17)$

$100 - 340 + 289 + 27$

$\mathbf{(x - y)^2 + (x + y) = 76}$

**16.) If $p = 1.5, q = 0.5$ then find the value of $(p + q)^2 - (2)^3$**

ANSWER:

$(p + q)^2 - (2)^3$

Here we use,

$(p + q)\ \mathbf{2} = p^2 + \mathbf{2}pq + q^{\ 2}$

$(\boldsymbol{p} + \boldsymbol{q})^2 - (\mathbf{2})^{\ 3} = p^2 + \mathbf{2}pq + q^{\ 2} - 8$

$\boldsymbol{p} = \mathbf{1}.\ \mathbf{5},\ \boldsymbol{q} = \mathbf{0}.\ \mathbf{5}$

$p^2 + \mathbf{2}pq + q^{\ 2} - 8 = 1.5^2 + \mathbf{2}\text{x}1.5\ \text{x}\ 0.5 + 0.5^{\ 2} - 8$

$=2.25 +1.5 + 0.25 - 8$

$= 4\text{-}8$

$\boldsymbol{(p + q)^2 - (2)^{\ 3} = -\ 4}$

**17.) If $\boldsymbol{a = 10,\ b = -5,\ c = 2}$, then find the value of $\boldsymbol{(a + b + c)^{\ 3}}$**

ANSWER:

$(\boldsymbol{a} + \boldsymbol{b} + \boldsymbol{c})^{\ 3}$

$(\mathbf{10} - \mathbf{5} + \mathbf{2})^{\ 3}$

$= (7)^{\ 3}$

$\boldsymbol{(a + b + c)^{\ 3} = 343}$

**18.) If $\boldsymbol{x} = \mathbf{100} / \sqrt{\mathbf{25}} + (\mathbf{1}^{\mathbf{0}} \times \mathbf{0})$ then find the value of $\boldsymbol{x^2}$**

ANSWER:

$\boldsymbol{x} = \mathbf{100} / \sqrt{\mathbf{25}} + (\mathbf{1}^{\mathbf{0}} \times \mathbf{0})$

We have to find value of $\boldsymbol{x^2}$

$\boldsymbol{x^2} = (\mathbf{100} / \sqrt{\mathbf{25}} + (\mathbf{1}^{\mathbf{0}} \times \mathbf{0}))^2$

$\boldsymbol{x^2} = 100^2 / 25$

$\boldsymbol{x^2 = 400}$

**19.) If $\boldsymbol{a = 101^2 - 100^2}$ then find the value of $\boldsymbol{a - 1}$**

ANSWER:

$\boldsymbol{a} = \mathbf{101}^2 - \mathbf{100}^2$

We have to find $\boldsymbol{a} - \mathbf{1}$

We know,

$(\boldsymbol{a} + \boldsymbol{b})(\boldsymbol{a} - \boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

We put, a = 101, b = 100

$(101 + 100)(101 - 100) = \mathbf{101^2} - \mathbf{100^2}$

$201 \times 1 = \mathbf{101^2} - \mathbf{100^2}$

$\mathbf{101^2} - \mathbf{100^2} = 201$

**The value of $\boldsymbol{a} - \mathbf{1} = 201 - 1 = 200$**

**20.) If $\boldsymbol{m} = \mathbf{100^2} - \mathbf{98^2}$ then find the value of $\boldsymbol{m} + \mathbf{4}$**

ANSWER:

$\boldsymbol{m} = \mathbf{100^2} - \mathbf{98^2}$

$(\boldsymbol{a} + \boldsymbol{b})(\boldsymbol{a} - \boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

We put, a = 100, b = 98

$(100 + 98)(100 - 98) = \mathbf{1}98 \times 2$

$\mathbf{1}00^2 - 98^2 = 396$

**The value of $\boldsymbol{m} + 4 = 396 + 4 = 400$**

**21.) If $\boldsymbol{a} = \mathbf{100}, \boldsymbol{b} = \mathbf{98}$ then find the value of $(\boldsymbol{a} - \boldsymbol{b})^2 + (\boldsymbol{a} + \boldsymbol{b})$**

ANSWER:

$\boldsymbol{a} = \mathbf{100}, \boldsymbol{b} = \mathbf{98}$

We have to find $(\boldsymbol{a} - \boldsymbol{b})^2 + (\boldsymbol{a} + \boldsymbol{b})$

We know,

$(a - b)^2 = a^2 - \mathbf{2}\ ab + b^2$

$(\boldsymbol{a} - \boldsymbol{b})^2 + (\boldsymbol{a} + \boldsymbol{b}) = a^2 - \mathbf{2}\ ab + b + (\boldsymbol{a} + \boldsymbol{b})$

$100^2 - \mathbf{2} \times 100 \times 98 + 98^2 + (100 + 98)$

**$(\boldsymbol{a} - \boldsymbol{b})^2 + (\boldsymbol{a} + \boldsymbol{b}) = 201$**

**22. ) Simplify: $(\sqrt{\mathbf{25}} - \sqrt{\mathbf{16}})(\sqrt{\mathbf{16}} - \sqrt{\mathbf{9}}) + \sqrt{\mathbf{36}} - \sqrt{\mathbf{16}}$**

ANSWER:

We know,

$\sqrt{\mathbf{25}} = 5$

$\sqrt{\mathbf{9}} = 3$

$\sqrt{\mathbf{16}} = 4$

$\sqrt{\mathbf{36}} = 6$

$(\sqrt{\mathbf{25}} - \sqrt{\mathbf{16}})(\sqrt{\mathbf{16}} - \sqrt{\mathbf{9}}) + \sqrt{\mathbf{36}} - \sqrt{\mathbf{16}}$ = (5-4) x (4 – 3) + 6 – 4

(5-4) x (4 – 3) + 6 – 4 = 1 x 1 + 2

$\mathbf{(\sqrt{25} - \sqrt{16})(\sqrt{16} - \sqrt{9}) + \sqrt{36} - \sqrt{16} = 3}$

**23.) Simplify: $(\boldsymbol{2a - b})^2 - (\boldsymbol{a + 2b})^2 + \boldsymbol{3b^2 + ab}$**

ANSWER:

Here we use,

$(\boldsymbol{2a} - \boldsymbol{b})^2 = (a - b)^2 = a^2 - \mathbf{2}ab + b^2$

a = 2a and b = b

$(\boldsymbol{2a} - \boldsymbol{b})^2 = 4a^2 - 4ab + b^2$

$(\boldsymbol{a} + \mathbf{2}\boldsymbol{b})^2 = (\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a^2} + \mathbf{2}\boldsymbol{ab} + \boldsymbol{b^2}$

a = a and b = 2b

$(\boldsymbol{a} + \mathbf{2}\boldsymbol{b})^2 = \boldsymbol{a^2} + 4\boldsymbol{ab} + 4\boldsymbol{b^2}$

$(\boldsymbol{2a} - \boldsymbol{b})^2 - (\boldsymbol{a} + \mathbf{2}\boldsymbol{b})^2 + \mathbf{3}\boldsymbol{b^2} + \boldsymbol{ab} = 4a^2 - 4ab + b^2 - \boldsymbol{a^2} + 4\boldsymbol{ab} + 4\boldsymbol{b^2} + \mathbf{3}\boldsymbol{b^2} + \boldsymbol{ab}$

$= 4a^2 - 4ab + b^2 - \boldsymbol{a^2} + 4\boldsymbol{ab} + 4\boldsymbol{b^2} + \mathbf{3}\boldsymbol{b^2} + \boldsymbol{ab}$

On solving,

$\mathbf{(2a - b)^2 - (a + 2b)^2 + 3b^2 + ab = 3a^2 - 7ab}$

**24.) Simplify: $(\boldsymbol{a + b})^2 + (\boldsymbol{a - b})^2 - \boldsymbol{ab}$**

ANSWER:

Here we use,

$(a - b)^2 = a^2 - \mathbf{2}ab + b^2$

$(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a^2} + \mathbf{2}\boldsymbol{ab} + \boldsymbol{b^2}$

$(\boldsymbol{a} + \boldsymbol{b})^2 + (\boldsymbol{a} - \boldsymbol{b})^2 - \boldsymbol{ab} = \boldsymbol{a^2} + \mathbf{2}\boldsymbol{ab} + \boldsymbol{b^2} + a^2 - \mathbf{2}ab + b^2 - \boldsymbol{ab}$

$\mathbf{(a + b)^2 + (a - b)^2 - ab = 2a^2 + 2b^2 - ab}$

**25.) Simplify: $(a - b)(a + b) + (a + b)(a - b) + a^2 - b^2$**

ANSWER:

We know,

$(a - b)(a + b) = a^2 - b^2$

$(a - b)(a + b) + (a + b)(a - b) + a^2 - b^2 = a^2 - b^2 + a^2 - b^2 + a^2 - b^2$

$a^2 - b^2 + a^2 - b^2 + a^2 - b^2 = 3a^2 - 3b^2$

**26.) If $(5)^2 - (4.9)^2 = x$, find the value of $(0.01 \times x)$**

ANSWER:

Here we use,

$(a - b)(a + b) = a^2 - b^2$

a = 5 and b = 4.9

(5 - 4.9) x (5 + 4.9) = $(5)^2 - (4.9)^2$

x = 0.1 x 9.9 =0.99

The value of $(0.01 \times x)$ = $(0.01 \times 0.1 \times 9.9)$

**$(0.01 \times x)$ =0.0099**

**28.) Simplify: $(x + y)^2 - (x - y)^2 + x - y$**

ANSWER:

Here we use,

$(x + y)^2 = x^2 + 2xy + y^2$

$(x - y)^2 = x^2 - 2xy + y^2$

$(x + y)^2 - (x - y)^2 + x - y = x^2 + 2xy + y^2 - x^2 - 2xy + y^2 + x - y$

$x^2 + 2xy + y^2 - x^2 - 2xy + y^2 + x - y = 4xy + x - y$

**$(x + y)^2 - (x - y)^2 + x - y = 4xy + x - y$**

**29.) What should be subtracted from $(a + b)^2$to make it $(a - b)^2$?**

ANSWER:

We know,

$(a - b)^2 = a^2 - 2ab + b^2$

$(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \boldsymbol{2ab} + \boldsymbol{b}^2$

**$4ab$ subtracted from $(a + b)^2$ to make it $(a - b)^2$**

**30.) What should be added in $25x^2 + 16y^2$ to make it $(5x + 4y)^2$?**

ANSWER:

We use

$(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \boldsymbol{2ab} + \boldsymbol{b}^2$

$(5x + 4y)^2 = 5x^2 + 2 \times 5x \times 4y + 4y^2$

$(5x + 4y)^2 = 25x^2 + 16y^2 + 40xy$

**$40x$y added in $25x^2 + 16y^2$ to make it $(5x + 4y)^2$**

**31.) $121m^2 - 100n^2$ should be divided by which expression to get $11m$ + 10n?**

ANSWER:

$121m^2 - 100n^2 / x = 11m + 10n$

By cross multiplication,

$121m^2 - 100n^2 / 11m + 10n = x$

$(a - b)(a + b) = a^2 - b^2$

$121m^2 - 100n^2 = (11m + 10n)(11m - 10n)$

On solving,

**X = $11m$–10n.**

**32.) Simplify: $(2x + 3y)^2 + 24xy$**

ANSWER:

$(2x + 3y)^2 + 24xy$

Here we use,

$(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \boldsymbol{2ab} + \boldsymbol{b}^2$

a = 2x  b = 3y

$(2x + 3y)^2 = 2x^2 + 2 \times 2x3y + 3y^2$

$(2x + 3y)^2$= 4 x ² + 12xy + 9y ²

$(2x + 3y)^2 + 24xy$ = 4 x ² + 12xy + 9y ²+ $24xy$

**$(2x + 3y)^2 + 24xy$ =4 x ² + 36xy + 9y ²**

**33.) Simplify: $(3x - 4y)^2 - 16y^2$**

ANSWER:

$(3x - 4y)^2 - 16y^2$

Here we use,

$(a - b)^2 = a^2 - 2ab + b^2$

a = 3x  b = 4y

$(3x - 4y)^2$ = 3x²–2x 3x4y + 4y²

$(3x - 4y)^2$ =9 x ² - 24xy + 16y ²

$(3x - 4y)^2 - 16y^2$ = 9 x ² - 24xy + 16y ²– $16y^2$

**$(3x - 4y)^2 - 16y^2$ =9 x ² - 24xy**

**34.) Simplify: $(2.5m - 0.5n)^2 + 2.5mn + 3.5mn$**

ANSWER:

$(2.5m - 0.5n)^2 + 2.5mn + 3.5mn$

Here we use,

$(a - b)^2 = a^2 - 2ab + b^2$

a = 2.5m  b = 0.5n

$(2.5m - 0.5n)^2$= 2.5m²–2 x 2.5mx 0.5n+ 0.5n ²

$(2.5m - 0.5n)^2$=6.25m²– 2.5mn + 0.25n ²

$(2.5m - 0.5n)^2 + 2.5mn + 3.5mn$

**= 6.25m² – 2.5mn + 0.25n ²+ $2.5mn + 3.5mn$**

$(2.5m - 0.5n)^2 + 2.5mn + 3.5mn$**= 6.25m²+ 3.5mn + 0.25n ²**

**35.) What should be subtracted from $(x + y)^2$to get $x^2 + y^2$?**

ANSWER:

$(\boldsymbol{x} + \boldsymbol{y})^2$

We know,

$(\boldsymbol{a} + \boldsymbol{b})^2 = \boldsymbol{a}^2 + \boldsymbol{2ab} + \boldsymbol{b}^2$

$(\boldsymbol{x} + \boldsymbol{y})^2 = x^2 + \boldsymbol{2}xy + y^2$

$x^2 + \boldsymbol{2}xy + y^2$ – Subtraction = $\boldsymbol{x}^2 + \boldsymbol{y}^2$

Subtraction = $x^2 + \boldsymbol{2}xy + y^2 - (\boldsymbol{x}^2 + \boldsymbol{y}^2)$

Subtraction = $\boldsymbol{2x}y$

**$\boldsymbol{2x}$ysubtracted from $(\boldsymbol{x} + \boldsymbol{y})^2$to get $\boldsymbol{x}^2 + \boldsymbol{y}^2$**

**36.) The sides of a rectangle are $\boldsymbol{5x}$ units and $\boldsymbol{7y}$ units. Find the area and perimeter of the rectangle.**

ANSWER:

Given that, the sides of a rectangle are $\boldsymbol{5x}$ units and $\boldsymbol{7y}$ units

Area of Rectangle = Length x Breadth

**Area of Rectangle = $\boldsymbol{5x}$ x $\boldsymbol{7y}$ = 35xy**

**Perimeter of Rectangle = 2 x (**Length + Breadth)

**Perimeter of Rectangle =2 x ($\boldsymbol{5x}$ +$\boldsymbol{7y}$)**

**Perimeter of Rectangle = 10x + 14y**

**37.) Find the value of $\boldsymbol{61 \times 5.9}$**

ANSWER:

$\boldsymbol{61} \times \boldsymbol{5}.\boldsymbol{9}$

We multiply without decimal point. After we give decimal point.

$\boldsymbol{61} \times \boldsymbol{59}$ = 3599

**$\boldsymbol{61 \times 5.9}$ = 359.9**

**38.) Find the value of $\boldsymbol{302 \times 298}$**

ANSWER:

$\boldsymbol{302} \times \boldsymbol{29}8$

We write,

$\mathbf{302} = (300 + 2)$

$\mathbf{298} = (300 - 2)$

$\mathbf{302} \times \mathbf{298} = (300 + 2) \times (300 - 2)$

We know,

$(\boldsymbol{a} - \boldsymbol{b})(\boldsymbol{a} + \boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

a =300 and b = 2

$(300 + 2) \times (300 - 2) = 300^2 - 2^2$

90000 – 4

$\mathbf{302 \times 298 = 89996}$

**39.) If $\boldsymbol{x} = \mathbf{2} + \sqrt{\mathbf{3}}$ and $\boldsymbol{y} = \mathbf{2} - \sqrt{\mathbf{3}}$, then find the value of $(\boldsymbol{x} - \boldsymbol{y})^2$.**

ANSWER:

Given,

$\boldsymbol{x} = \mathbf{2} + \sqrt{\mathbf{3}}$ and $\boldsymbol{y} = \mathbf{2} - \sqrt{\mathbf{3}}$

We have to find $(\boldsymbol{x} - \boldsymbol{y})^2$.

$(\boldsymbol{x} - \boldsymbol{y})^2 = x^2 - 2xy + y^2$

$(\mathbf{2} + \sqrt{\mathbf{3}} - \mathbf{2} - \sqrt{\mathbf{3}})^2 = (\mathbf{2} + \sqrt{\mathbf{3}})^2 - (\mathbf{2} \times \mathbf{2} - \sqrt{\mathbf{3}} \times \mathbf{2} + \sqrt{\mathbf{3}}) + (\mathbf{2} - \sqrt{\mathbf{3}})^2$

$(\mathbf{2} + \sqrt{\mathbf{3}} - \mathbf{2} - \sqrt{\mathbf{3}})^2 = 4 + 3 - 11 + 1$

$\mathbf{(2 + \sqrt{3} - 2 - \sqrt{3})^2 = 12}$

**42.) If $(\mathbf{53})^2 = (\mathbf{48})^2 + \mathbf{5}\boldsymbol{x}$, then find the value of $\boldsymbol{x}$.**

ANSWER:

Given,

$(\mathbf{53})^2 = (\mathbf{48})^2 + \mathbf{5}\boldsymbol{x}$

$\mathbf{5}\boldsymbol{x} = (\mathbf{53})^2 - (\mathbf{48})^2$

We use,

$(\boldsymbol{a} - \boldsymbol{b})(\boldsymbol{a} + \boldsymbol{b}) = \boldsymbol{a}^2 - \boldsymbol{b}^2$

a =53 and b = 48

(53 – 48) x (53 + 48) = $(\mathbf{53})^2$ - $(\mathbf{48})^2$

5 x 101 = $(\mathbf{53})^2$ - $(\mathbf{48})^2$

$(\mathbf{53})^2$ - $(\mathbf{48})^2$= 505

$\mathbf{5}\boldsymbol{x}$ = $(\mathbf{53})^2$ - $(\mathbf{48})^2$

$\mathbf{5}\boldsymbol{x}$ =505

X = 505 / 5

**X = 101**

**43.) If $\boldsymbol{a} = \mathbf{0.8}$ and $\boldsymbol{b} = \mathbf{0.5}$, then find the value of $\boldsymbol{a}^2 + \boldsymbol{b}^2 + \boldsymbol{ab}$.**

ANSWER:

Given,

$\boldsymbol{a}$ = $\mathbf{0}.\mathbf{8}$ and $\boldsymbol{b}$ = $\mathbf{0}.\mathbf{5}$

We have to find $\boldsymbol{a}^2 + \boldsymbol{b}^2 + \boldsymbol{ab}$.

$\boldsymbol{a}^2 + \boldsymbol{b}^2 + \boldsymbol{ab}$. = $(0.8)^2 + (0.5)^2 + 0.8 \times 0.5$

$\boldsymbol{a}^2 + \boldsymbol{b}^2 + \boldsymbol{ab}$. = 0.64 + 0.25 + 0.40

$\boldsymbol{a}^2 + \boldsymbol{b}^2 + \boldsymbol{ab}$. =1.29

**44.) If $\boldsymbol{x} = \mathbf{5}$ and $\boldsymbol{b} = \mathbf{3.2}$, then find the value of $\boldsymbol{x}^2 + \boldsymbol{y}^2 - \boldsymbol{xy}$.**

ANSWER:

Given,

$\boldsymbol{x}$ = $\mathbf{5}$ and $\boldsymbol{b}$ = $\mathbf{3}.\mathbf{2}$

We have to find$\boldsymbol{x}^2 + \boldsymbol{y}^2 - \boldsymbol{xy}$.

$\boldsymbol{x}^2 + \boldsymbol{y}^2 - \boldsymbol{xy}$ = $5^2 + (3.2)^2 - 5(3.2)$

$\boldsymbol{x}^2 + \boldsymbol{y}^2 - \boldsymbol{xy}$ = 25 + 10.24 – 16

$\boldsymbol{x}^2 + \boldsymbol{y}^2 - \boldsymbol{xy}$ =19.24

**45.) If x= $\mathbf{3} + \mathbf{2}\sqrt{\mathbf{2}}$ and $\boldsymbol{y} = \mathbf{17} + \mathbf{12}\sqrt{\mathbf{2}}$, then find the value of $\sqrt{\boldsymbol{y}} - \sqrt{\boldsymbol{x}}$**

ANSWER:

Given,

x= $\mathbf{3} + \mathbf{2}\sqrt{\mathbf{2}}$ and $\boldsymbol{y} = \mathbf{17} + \mathbf{12}\sqrt{\mathbf{2}}$

We have to find $\sqrt{\boldsymbol{y}} - \sqrt{\boldsymbol{x}}$

$\sqrt{\boldsymbol{x}} = \sqrt{\mathbf{3}} + \mathbf{2}\sqrt{\mathbf{2}}$

$\sqrt{\boldsymbol{y}} = \sqrt{\mathbf{17}} + \mathbf{12}\sqrt{\mathbf{2}}$

$\sqrt{\boldsymbol{y}} - \sqrt{\boldsymbol{x}} = \sqrt{\mathbf{17}} + \mathbf{12}\sqrt{\mathbf{2}} - \sqrt{\mathbf{3}} + \mathbf{2}\sqrt{\mathbf{2}}$

On solving we get,

$\sqrt{\boldsymbol{y}} - \sqrt{\boldsymbol{x}} = \mathbf{2} + \sqrt{\mathbf{2}}$